REMARKS

Claims 1, 10, 22 and 55 have been amended; claims 3-4, 8-9, 12 and 24-26 have been cancelled; and new claims 58-62 have been added. Claims 5, 14, 16-20, 28, and 32-48 were previously cancelled. Accordingly, claims 1-2, 6-7, 10-11, 13, 15, 21-23, 27, 29-31 and 49-62 are currently pending in the present application.

I. **Amendments:**

Claim 1 has been amended to recite that the anionic microparticlate material is anionic silica-based particles. Support for this amendment can be found in the specification at page 9, line 13 to page 11, line 6, and previously presented claim 26. No new matter has been added.

Claims 10, 22 and 55 have been amended to be consistent with amended claim 1. Again, no new matter has been added.

New claims 58 and 60 recite that the anionic silica-based particles are in the form of a silica sol having an S-value in the range of from 8 to 45% and a specific surface area of from 500 to 950 m^2/g. Support for these claims can be found in the specification at page 10, lines 10-23. No new matter has been added.

New claims 59, 61 and 62 recite that the monomer mixture consists of from 2 to 50 mole% cationic monomer having an aromatic group and from 98 to 50 mole% (meth)acrylamide. Support for these claims can be found in the specification at page 7, lines 6-15. No new matter has been added.

II. **The Invention:**

The present invention relates to a papermaking process in which drainage and retention aids are used as additives to a cellulosic suspension, as defined in claims 1,

22 and 27. The invention provides improved drainage (dewatering) and retention when producing paper from an aqueous cellulosic suspension having a high conductivity.

III. Rejections:

On page 2 of the Office Action, the rejection of claims 1-4, 6-13, 15, 21-27, 29-31 and 49-57 under 35 U.S.C. 103(a) as being unpatentable over Langley et al. (US Patent No. 4,753,710), in view of Ogawa et al. (JP 63-92800), further evidenced by Satterfield et al. (U.S. Patent No. 5,755,930) or Blanco et al. in "Predicting the impart of closing the water system in paper mills," was maintained from the prior Office Action dated March 22, 2007. Applicants respectfully traverse.

Applicants thank Examiner Fortuna for extending the courtesy of a telephonic interview with Applicants' representative on May 5, 2008. Applicants' representative discussed the possibility of amending the claims to recite that the anionic material is anionic silica-based particles and distinctions between such claims and Langley et al., contending that Langley et al teach away from such claims. The Summary of the Interview and the issues raised by Applicants' representative are incorporated in the detailed remarks below.

Langley et al disclose a process for making paper or paper board in which a cationic organic polymer and an anionic inorganic material are added to an aqueous cellulosic suspension. Applicants submit that Langley et al. do not teach or suggest the polymers as presently claimed. This is also noted in the Office Action (of March 22, 2007) on page 3, which states that "Langley et al. ... do not teach the polymers as claimed."

However, the Office Action contends that Ogawa et al disclose similar cationic polymers to those presently claimed and that it would have been obvious to substitute the Ogawa et al cationic polymers for the cationic polymers of Langley et al. Applicants respectfully disagree.

Ogawa et al. disclose a paper strength reinforcing agent having as an effective component a water-soluble copolymer comprising the structural monomer components (a) from 0.5 to 10 mole% of monomer represented by the general formula (I) as indicated at page 2 of Ogawa et al., (b) from 0.2 to 5 mole% of α,β-unsaturated monocarboxylic acid and/or α,β-unsaturated monocarboxylic acid monomer or a salt thereof, and (c)) from 85 to 99.3 mole% acrylamide and/or methacrylamide monomer. Ogawa et al state that this polymer is effective as a paper strength reinforcing agent, even where large amounts of electrolyte is present in the paper making process (See Page 4, second paragraph).

Applicants are unaware of any disclosure, teaching or suggestion by Langley et al of using the disclosed combination of a cationic organic polymer and anionic inorganic material in a high conductivity paper making process. It is submitted that there is no mention by Langley et al of high conductivity systems. Accordingly, Applicants respectfully submit that one skilled in the art would have no reason to look to Langley et al to provide a drainage and retention aid for use in a high conductivity paper making process or to substitute the polymer of Ogawa et al for use in the retention aid of Langley et al, which includes an anionic inorganic material. Applicants respectfully submit that the only motivation to combine these references is from the instant application with the improper use of hindsight.

Moreover, Applicants respectfully submit that Langley et al teach away from the presently claimed invention. A reference teaches away when a person of ordinary skill, upon reading the reference, would be led in a direction divergent from the path the applicant has taken. *Tec Air Inc. v. Denso Mfg. Mich. Inc.*, 192 F.3d 1353, 1360, 52 USPQ2d 1294, 1298 (Fed. Cir. 1999).

The presently claimed invention involves use of a drainage and retention aid that includes anionic silica-based particles in a paper making system. The silica-based particles according to the presently claimed invention are distinguished from clays, such as bentonite (See specification at page 9, lines 13 to page 11, line 14). The goal (or

object) of the present invention is to reduce dewatering time and increase retention. In contrast to the presently claimed invention, Langley et al teach that "it is essential to use bentonite rather than any other anionic particulate material." (See Langley et al at col. 10, lines 38-40). Further, the examples of Langley et al indicate that use of colloidal silica (in combination with a cationic polymer) results in significantly inferior results, in terms of retention, compared to comparable amounts of bentonite. (See e.g., col. 12, Table 1). Applicants respectfully submit that one skilled in the art with a desire to increase retention would be led in a direction away from using anionic silica-based particles (as presently claimed) and instead led to using only bentonite. Accordingly, Applicants submit that Langley et al teach away from the presently claimed invention. *See Tec Air*, 52 USPQ2d at 1298.

Satterfield et al. disclose a process for making filled paper comprising blending filler with a cationising amount of cationic polymer which provides improved retention of filler for "dirty" suspensions, and further discloses that prolonged recycling of white water may contribute to the suspensions being "dirty." Satterfield et al. teach that the "dirty" suspension can be such that the white water has conductivity above about 1,000, and preferably above about 1,500 micro Siemens, often 2,000 to 3,000 micro Siemens. Satterfield et al. disclose a wide variety of cationic polymers (See col. 6, line 3 to col. 7, line 25), but fail to disclose, teach or suggest the cationic polymer as presently claimed. In fact, Applicants are unaware of any teaching or suggestion by Satterfield et al. with regard to using a cationic organic polymer having an aromatic group.

Blanco et al. discuss various aspects of closing the water system in paper mills and paper making processes. However, Blanco et al. do not address improvements in drainage and retention, and do not disclose, teach or suggest the cationic polymer or the anionic microparticulate material as claimed according to the present application.

Although Blanco et al. disclose in Table I on page 436 that "typical" compositions of white water have conductivities in the range of 3-11 mS/cm, Blanco et al. are silent as to the source of the data, including the number of mills sampled and the reason for the

high conductivity. Moreover, on page 437 under "Inorganic ions," Blanco states that the normal range of conductivities is 500 to 10,000 μS/cm, i.e. 0.5-10 mS/cm. Thus, it is respectfully submitted that the reason for the high conductivities in the white water is likely from high levels of inorganic ions present at the sampled mills. Moreover, Blanco is completely silent with regard to using a cationic organic polymer having an aromatic group.

Regarding the teachings of Blanco, the European Opposition Division, in the European Opposition proceeding for corresponding European patent EP-B-1080272, found it reasonable to assume that the high conductivities (disclosed by Blanco (ref. D10' in the Opposition)) originates from extremely high levels of ionic impurities, e.g. Ca^{2+}, and stated that it is well known that such water sources can be found, for example, on the Iberian peninsula. See Decision from Opposition Division at pages 6-7 (Ex. A to Amendment previously filed on August 3, 2006). The Decision ultimately rejected the opposition finding that none of the cited references suggest the application on high conductivity suspensions of aromatic group containing polymers.

The European Opposition Division's analysis of Blanco is further supported by the declaration of John Nicholass, which was submitted in the European opposition proceeding (See Ex. B to Amendment filed on August 3, 2006). In his declaration, Mr. Nicholass provides information about conductivity data from 1998 to 1999 that has been compiled from 188 commercial paper and board making applications using white water recirculation, in different countries and regions throughout the world. A review of the data reveals that the applications in the Iberia region tend to have high conductivities. Further, the data shows that the vast majority of applications using white water recirculation have conductivities under 2.4 mS/cm.

This is also supported by the declaration of Hans Hallstrom, which was previously filed on February 5, 2003, in response to the Office Action dated September 5, 2002, and which provided conductivity data from 20 European, North American and Japanese paper machines commercially producing paper from processes that included

white water recirculation. The data shows that the majority (or approx. 80%) of the mills were commercially producing paper from cellulosic suspensions having conductivity levels in range of 500-1800 μS/cm. Therefore, Applicants respectfully submit that the prior art, when read as a whole (including Satterfield and Blanco), teaches one skilled in the art that, although a paper making process that includes white water recirculation may include a suspension having conductivity in the claimed range, the vast majority of such processes will include suspensions having a conductivity out side of the claimed range.

It is the invention as a whole, and not some part of it, which must be obvious to support a rejection under 35 USC §103(a). *In re Antonie*, 195 USPQ 6, 8 (CCPA 1977). The unsuggested recognition of a relationship between the result produced and the particular design parameters is the touchstone of nonobviousness. A process is unobvious in cases where optimizing a known result-effective variable produces unexpectedly good results or where the art did not recognize that the parameter optimized was a result-effective variable. *Id.* at 8-9.

In the instant case, optimizing the conductivity within the range of 2.4-10.0 mS/cm in connection with drainage and retention aids that include anionic silica-based particles and a cationic polymer (containing an aromatic group), as presently claimed, provides unexpectedly good retention and dewatering effects. This is confirmed by the examples of the present invention. In that regard, the examples of the present invention show that at higher conductivities, i.e., 2.4 (ex. 8) and 5.5-10mS/cm (ex. 3) the combination of anionic silica-based particles and aromatic cationic polymer shows both better retention and dewatering effect.

Furthermore, contrary to teachings of Langley et al, the examples show that use of anionic silica-based particles (ex. 5) actually gave better results than using bentonite (ex. 6) under similar conditions, including a conductivity of 10.0 mS/cm.

Applicants respectfully submit that there is nothing in the prior art showing that one of ordinary skill in the art would be able to foresee the improvement in drainage and retention that results from using the drainage and retention aid according to the present claims. Applicants submit that only applicant's disclosure provides any motivation for combining the isolated disclosures of the cited references in the manner combined in the Office Action.

Therefore, Applicants respectfully request the rejection of claims 1-4, 6-13, 15, 21-27, 29-31 and 49-57 under 35 U.S.C. 103(a) as being unpatentable over Langley et al., in view of Ogawa et al., further evidenced by Satterfield et al. or Blanco et al., be withdrawn.

IV. **Conclusion**:

Applicants respectfully submit that the application, including claims 1-2, 6-7, 10-11, 13, 15, 21-23, 27, 29-31 and 49-62, is in proper form for allowance, which action is earnestly solicited. If resolution of any remaining issue is required prior to allowance of the application, it is respectfully requested that the Examiner contact Applicants' undersigned attorney at the telephone number provided below.

Respectfully submitted,

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